

No: Y15- 004PD

Title: Configuration Management Program

Rev. Date: 12/23/03

This document defines the Configuration Management Program for the Y- 12 Complex. Section II discusses the concept of Configuration Management, the elements of a Configuration Management Program, and the basic Configuration Management relationships.

REQUIRED FOR WORKING COPIES ONLY

A working copy of this document is valid only until the document revision number has changed on the Web. The paper copy should be dated and signed the day it is printed. If you continue working from the paper copy, you should reverify its accuracy on the Web after seven calendar days.

Date Verified/Reverified	Signature/Initials

**BWXT Y-12, L.L.C.
Management Requirements**

BWXT Y-12
Program Description

Number: Y15-004PD
Rev. Date: 12/23/03
Supersedes: 08/15/02
Page: 1 of 33

Subject: Configuration Management Program

[L. T. Reed /s/]
Written by/Signature/Printed Name

1/14/04
Date

Approvals:

[Approval Signatures and Dates on File]

[John H. Gertsen /s/]
Functional Area Manager/Signature/Printed Name

1/14/04
Date

[Pamela A. Horning /s/]
Executive Manager/Signature/Printed Name

1/14/04
Dte

3/01/04
Effective Date

Concurrence:

This document has completed the management requirements process.

S. G. Brown /s/ 1/16/04
Requirements Management

This document has been reviewed by an Authorized Derivative Classifier and UCNI Reviewing Official and has been determined to be UNCLASSIFIED and contains no UCNI.

This review does not constitute clearance for public release.

D.D. Bunton /s/ 1/14/04
Signature and Date

Subject: Configuration Management Program

TABLE OF CONTENTS

I.	INTRODUCTION.....	4
II.	WHAT IS CONFIGURATION MANAGEMENT?	4
III.	WHO OWNS CONFIGURATION MANAGEMENT?.....	6
IV.	WHAT IS THE APPLICATION AND SCOPE OF THE CONFIGURATION MANAGEMENT PROGRAM?.....	10
V.	WHAT ARE THE DRIVERS FOR THE CONFIGURATION MANAGEMENT PROGRAM?.....	11
VI.	WHAT ARE THE ELEMENTS OF THE CONFIGURATION MANAGEMENT PROGRAM?.....	12
VII.	WHAT RELATED AREAS ARE IMPORTANT TO THE CONFIGURATION MANAGEMENT PROGRAM?.....	21
VIII.	HOW IS CONFIGURATION MANAGEMENT APPLIED DURING DESIGN AND CONSTRUCTION?	29
IX.	RECORDS.....	33
X.	OTHER DOCUMENTS NEEDED	33

Subject: Configuration Management Program

REVISION LOG

(Page 1 of 1)

Revision Date	Description of Change	Pages Affected
12/23/03	DMR-03-ET-048 This revision specifically address the use of one-line diagrams and process instrumentation diagrams as the generally accepted way of denoting as-built functional configuration of systems and equipment in the Configuration Management program. Likewise, it clarifies the principle determination of the degree of reconstitution needed to support a given modification and provides clarification on surveillance and inspection activity requirements to assure continued reliable function of selected SSCs.	8, 15, 19, 20, 24, 30, 33
08/15/02	DM/R-02-ET-012 This revision has been made to include clarification of roles and responsibilities, to include the graded approach used at Y-12, and to reflect new and revised processes resulting from implementation of the redefined Conduct of Engineering Program.	All
11/01/00	BWXT Y-12 Blue Sheet	All
02/25/00	DM/R-00-CM-001 Supersedes Y/ES-110, Configuration Management Program Plan and creates an Energy Systems Configuration Management Program Description.	All

Subject: Configuration Management Program

I. INTRODUCTION

This document defines the Configuration Management Program for the Y-12 Complex. Section II discusses the concept of Configuration Management, the elements of a Configuration Management Program, and the basic Configuration Management relationships.

Section III defines the ownership and interfaces among the various organizations needed to support an effective Configuration Management Program.

Section IV discusses the strategy of application of the Configuration Management Program throughout the lifecycle of a facility or system. In this Section, the identification of structures, systems, and components (SSC) and the application of a grading process for SSCs are introduced.

Section V identifies the drivers for implementation of a Configuration Management Program.

In Section VI, the elements of Configuration Management that must be in place and functioning for the objectives of Configuration Management to be satisfied are briefly described. These elements are Organization & Administration, Requirements, Change Control, Document Control, and Assessments.

Section VII covers areas that are related to an effective Configuration Management Program. These topics include Design Authority, System Engineer, Design/Operations Documentation, Integrated Safety Management, Procurement Control, and Material Control.

Section VIII addresses the Configuration Management considerations for Design and Construction. Some of these considerations are Identification of Design Inputs, Configuration Management Requirements, Transition Requirements, Design Change Control, Facility/System Design Descriptions, etc., and their importance to providing an accurate, documented technical basis to support Operations.

II. WHAT IS CONFIGURATION MANAGEMENT?

The goal of Configuration Management is to identify important items, know their requirements, control changes, and keep accurate documentation. Or more formally stated, Configuration Management is an integrated management process that establishes (1) the requirements, (2) the design/operations documentation and (3) the physical/functional configuration of a structure, system, or component (SSC) and maintains consistency among these items as changes are made.

Subject: Configuration Management Program

II WHAT IS CONFIGURATION MANAGEMENT? (cont.)

Within the Department of Energy (DOE), a Configuration Management Program is an integration of the following elements: organization & administration, requirements, change control, document control, and assessments.

The **Organization & Administration** element manages the Configuration Management Program and coordinates the effective implementation of the other elements. It identifies the organizational interfaces and communicates responsibilities and authorities to personnel through implementing procedures.

The **Requirements** element defines the constraints and objectives placed on the physical/functional configuration. This element provides the information needed to decide if a proposed change is acceptable or not acceptable. A change that violates the requirements could lead to adverse consequences.

The **Change Control** element evaluates and dispositions proposed changes based upon the requirements. If the change is determined to be acceptable and within the requirements, only then may the change be implemented.

The **Document Control** element ensures that design/operations documents used to make important decisions are kept current with the physical/functional configuration and with the requirements.

The **Assessments** element evaluates the physical/functional configuration against the applicable requirements. It also periodically examines the change and document control practices to see if they are adequate.

The basic Configuration Management relationships are graphically illustrated by the triangle as shown in Figure 1. Change control and document control keeps the points of the triangle consistent. Assessments provide a measure of the effectiveness and compliance of the overall process.

Subject: Configuration Management Program

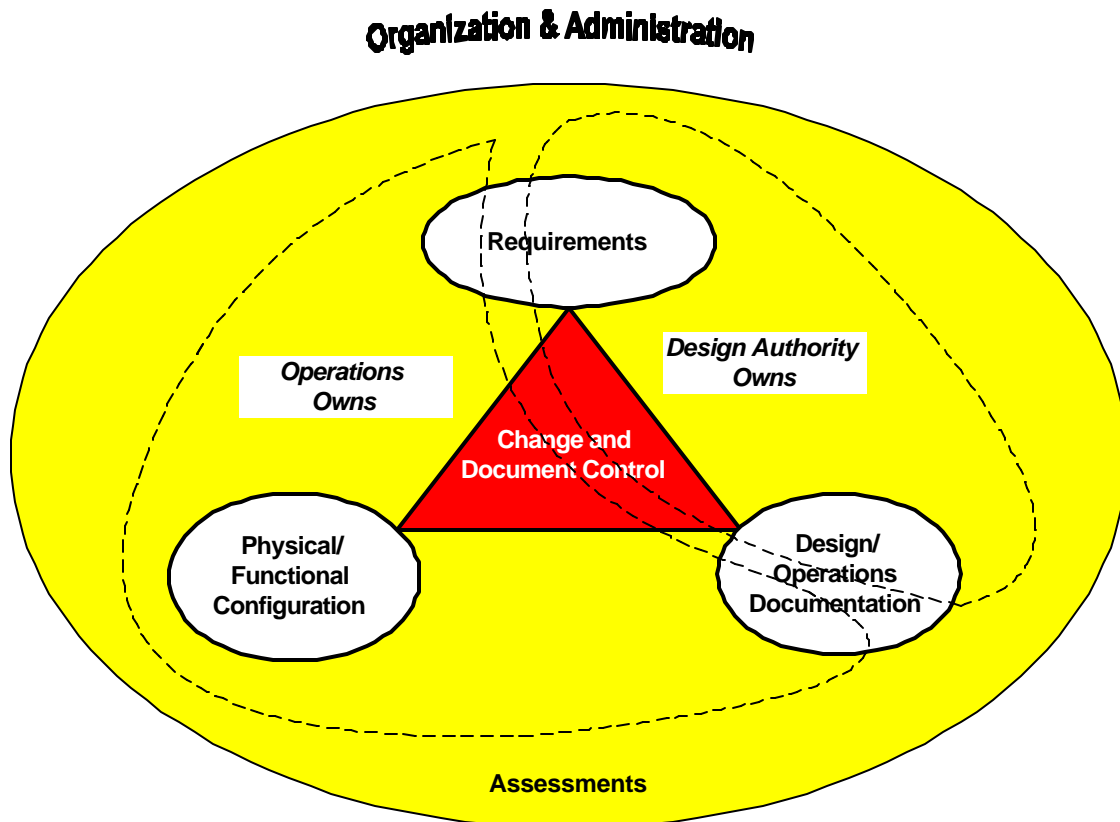


Figure 1—Basic Configuration Management Relationships

III. WHO OWNS CONFIGURATION MANAGEMENT?

For a Configuration Management Program to be effective, Ownership and the interfaces among the various organizations must be understood. The Operations Manager/System Owner owns the physical/functional configuration, the operational requirements, and the operations documentation.

Engineering is responsible for ensuring that the Design Authority function is properly executed. Engineering, as the Design Authority, owns the design requirements and the design documentation including the design basis documentation. Both parties must control the requirements and the documentation they own through integrated change and document control processes. Assessments of the effectiveness of the Configuration Management Program and the change and document control processes are periodically performed to provide feedback on needed improvements to the Operation Manager/System Owner and Design Authority, as appropriate.

Subject: Configuration Management Program

III. WHO OWNS CONFIGURATION MANAGEMENT? (cont.)

For the Configuration Management Program to be effective, proper interfaces must be established among the various organizations as follows:

NOTE 1: This is not intended to be an all-inclusive list but provides examples of interfaces.

NOTE 2: Interfacing organizations must ensure that new or revised Management Requirements that involve Configuration Management or establish Acceptance Criteria are reviewed by Engineering for concurrence.

A. Operations

- Establishes operations functional & performance requirements inputs.
- Helps develop and approves System Requirements Documents and Safety Basis Documents.
- Assists in identification and grading of SSCs.
- Prepares Unreviewed Safety Question Determinations (USQD)
- Establishes and maintains the Operations Documentation.
- Ensures operation within the Design/Operations Documentation.
- Controls the physical and functional configuration of operating facilities or systems.
- Ensures proposed changes to existing facilities or systems not within previously established and approved design and safety requirements or envelopes are reviewed and approved by the Design Authority.
- Authorizes implementation of approved changes to existing facilities or systems.

B. Maintenance

- Ensures that unauthorized maintenance changes are not made to the configuration of existing facilities or systems.
- Develops work instructions required to implement approved change packages.
- Executes work in accordance with approved work control processes.
- Identifies that a field change is required if a change package cannot be implemented as approved.
- Supports field verification/ walkdown efforts.
- Ensures that systems and equipment are labeled with the correct unique identifying tags.

Subject: Configuration Management Program

III. WHO OWNS CONFIGURATION MANAGEMENT? (cont.)

C. Environmental, Safety and Health

- Performs reviews for compliance with the approved Environmental Permits.
- Coordinates preparation, review, and submission of NEPA documents.
- Coordinates preparation, review, and submission of Local and State Permits.
- Coordinates preparation of Environmental Assessments or Environmental Impact Statements.

D. Engineering

- Ensures the Design Authority function is properly executed (refer to Section VII-A for more detail on Design Authority).
- Identifies and grades SSCs in conjunction with Operations.
- Establishes and maintains the Design Documentation.
- Assists Project Management in preparation of requirements for Configuration Management, Quality Assurance, and Transition.
- Prepares System Requirements Documents and Design Criteria.
- Performs or oversees design to translate design inputs into design outputs.
- Reviews and approves changes to SSCs that are not within previously established and approved design or safety requirements or envelopes.
- Reviews interfacing organizations Management Requirements as applicable.
- Administers the Facility Safety and Nuclear Criticality Safety Programs.
- Performs Hazards Evaluations, Accident Analyses, and Safety Analyses in support of Operations.
- Develops Safety Basis documentation in support of Operations.
- Administers the USQD Program.
- Develops and issues new, revised, or reactivated nuclear criticality safety evaluations (CSEs), nuclear criticality safety requirements (CSRs), and nuclear criticality safety analyses (CSAs).
- Provides facility safety and nuclear criticality safety criteria to design development or design changes.
- Provides technical support for maintenance/construction activities.
- Evaluates design features for safety and determines appropriate surveillance or inspection activities to assure their continued reliable function.

Subject: Configuration Management Program

IV. WHO OWNS CONFIGURATION MANAGEMENT? (cont.)

E. Project Management

- Establishes and documents system requirements for projects.
- Establishes and documents Configuration Management and Quality Assurance requirements for projects.
- Establishes and documents the Transition requirements for projects.

F. Quality

- Ensures the quality aspects of work or activities performed.
- Administers the Procurement Quality Program.
- Supports organizations in identifying Quality Assurance requirements.

G. Records and Administrative Services

- Administers the Document Control Program.
- Establishes, maintains, and manages the Document Control and Records Management application, and the SMART (System to Manage Archives, Records, and documents) System.
- Establishes requirements, and administers Records Management.
- Maintains records and documents in the Facility Services Document Management Center, implementing processes for the storage, protection, and control of documents and records.

H. Training

- Establishes, maintains and manages the training program.
- Schedules and maintains compliance with meeting Configuration Management training requirements for personnel.

Subject: Configuration Management Program

IV. WHAT IS THE APPLICATION AND SCOPE OF THE CONFIGURATION MANAGEMENT PROGRAM?

The lifecycle of a facility or system consists of three basic phases. These phases are design and construction (or project), operations, and deactivation/decontamination/decommissioning. This program description addresses the application and integration of the Configuration Management Program for both the project and the operations phases of a facility or system. This program description **does not** currently address the application of the Configuration Management Program for the deactivation, decontamination, and decommissioning phase of a facility or system. Figure 2 depicts the Configuration Management Program over the design and construction and operations phases of a facility or system.

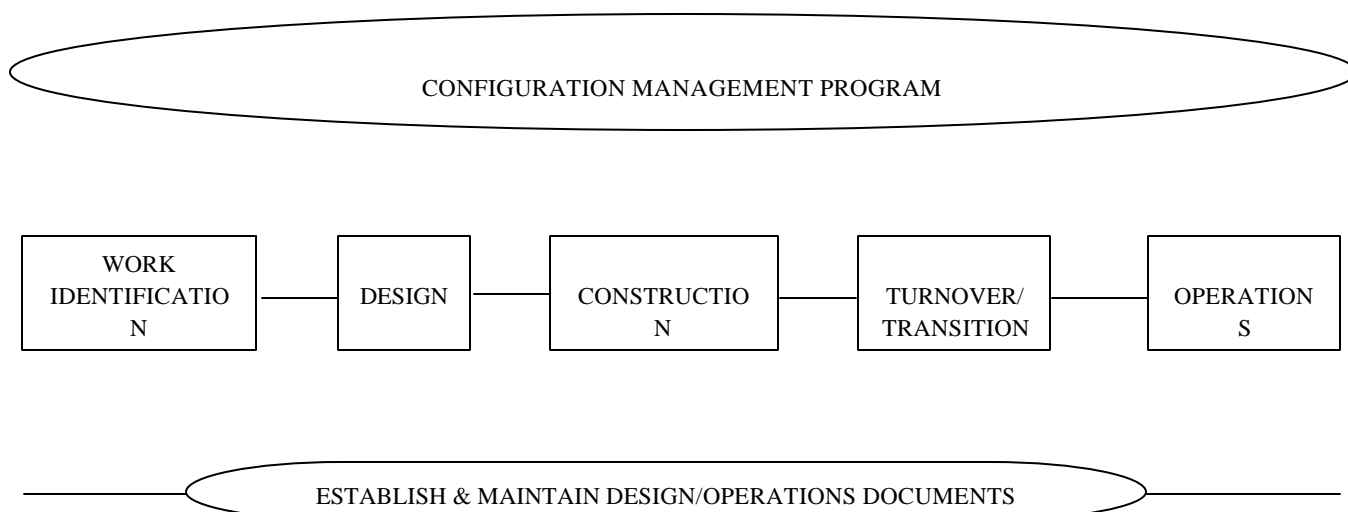


Figure 2—Relationship of the Configuration Management Program over the design and construction and operations phases of a Facility or System.

The SSCs included in the Configuration Management Program are identified and documented on approved lists based upon established methodology and criteria as defined in Y15-009INS, *Criteria for Application of Y-12 Configuration Management Program*. This process provides a significant part of the graded approach by defining which SSCs are subject to configuration management requirements. SSCs not meeting these criteria, therefore not on the approved list, are thereby exempted from the requirements of the Configuration Management Program. The SSCs included in the Configuration Management Program are graded. The SSC grade determines the level of formality, depth, and rigor to apply in design, quality assurance, procurement, material control, safety and technical reviews and inspections and the magnitude of resources to be invested.

Subject: Configuration Management Program

IV. WHAT IS THE APPLICATION AND SCOPE OF THE CONFIGURATION MANAGEMENT PROGRAM? (cont.)

The grading criteria provided in Y15-001INS, *Grading Criteria for Y-12 Facilities and Systems* is applied to determine the SSC grade. The grading process is documented on SSC Grading Worksheets that are retained as controlled documents.

As a minimum, the SSCs included in the Configuration Management Program are graded relative to their importance to:

- Safety (those necessary to protect the public, on-site personnel, and facility workers from nuclear or other hazards),
- Environment (those necessary to protect the environment from damage or to satisfy environmental requirements or permits),
- Mission (those required to avoid interruption of programmatic missions or severe cost impacts).

Through the grading process SSCs are assigned a numerical ranking. The grading process addresses Safety Class, Safety Significant, and Non-Nuclear-Safety Significant SSCs as determined by Safety Analysis and Hazard Evaluations. The grading process also considers other factors such as the specific function(s) of the SSC and nuclear criticality control requirements.

V. WHAT ARE THE DRIVERS FOR THE CONFIGURATION MANAGEMENT PROGRAM?

The drivers for the Configuration Management Program consists of the following:

- 10 CFR 830.120, *Quality Assurance Requirements*
- 29 CFR 1910.119, *Process Safety Management of Highly Hazardous Chemicals*
- DOE O 414.1A, *Quality Assurance*
- DOE O 430.1A, *Life Cycle Asset Management*
- DOE P 450.4, *Safety Management System Policy*
- *Configuration Management Standards/Requirements Identification Document*
- *Engineering Design & Construction Contractual Requirements.*
- *Facility Safety Standards/Requirements Identification Document*
- *Operations Standards/Requirements Identification Document*
- *Quality Assurance Standards/Requirements Identification Document*

Subject: Configuration Management Program

VI. WHAT ARE THE ELEMENTS OF THE CONFIGURATION MANAGEMENT PROGRAM?

The overall objective of the Configuration Management Program is to establish (or reestablish, if needed) and maintain (1) the requirements, (2) the design/operations documentation, and (3) the physical/functional configuration for a facility or system. During the establishment of these items, the objective of the Configuration Management Program must be accomplished from: work or change identification, through planning, design, safety and technical reviews, approval, procurement, construction, and turnover/transition to operations control. During the maintenance of these items, the objective of the Configuration Management Program must be accomplished through the operations controls that: (1) ensure the facility or system is operated within the requirements and the design/operations documentation and (2) that changes to the physical/functional configuration, the requirements and the design/operations documentation are properly identified, evaluated, and controlled.

The Configuration Management Program uses a graded approach to ensure that the appropriate levels of management control and work process execution are applied based on the grade of the SSC. The basis for the graded approach is the identification of SSCs that are included in the Configuration Management Program and the grading of these SSCs, as described in Section IV. The grade of the SSC is used to determine the level of formality, depth, and rigor applied to design recovery and reconstitution, change control, procurement control, material control, as described in subsequent Sections. The Configuration Management Program is flowed down through numerous integrated implementing procedures.

The basic elements of Configuration Management that must be in place and functioning for these objectives to be satisfied are:

- Organization & Administration
- Requirements
- Change Control
- Document Control
- Assessments.

Subject: Configuration Management Program

VI. WHAT ARE THE ELEMENTS OF THE CONFIGURATION MANAGEMENT PROGRAM? (cont.)

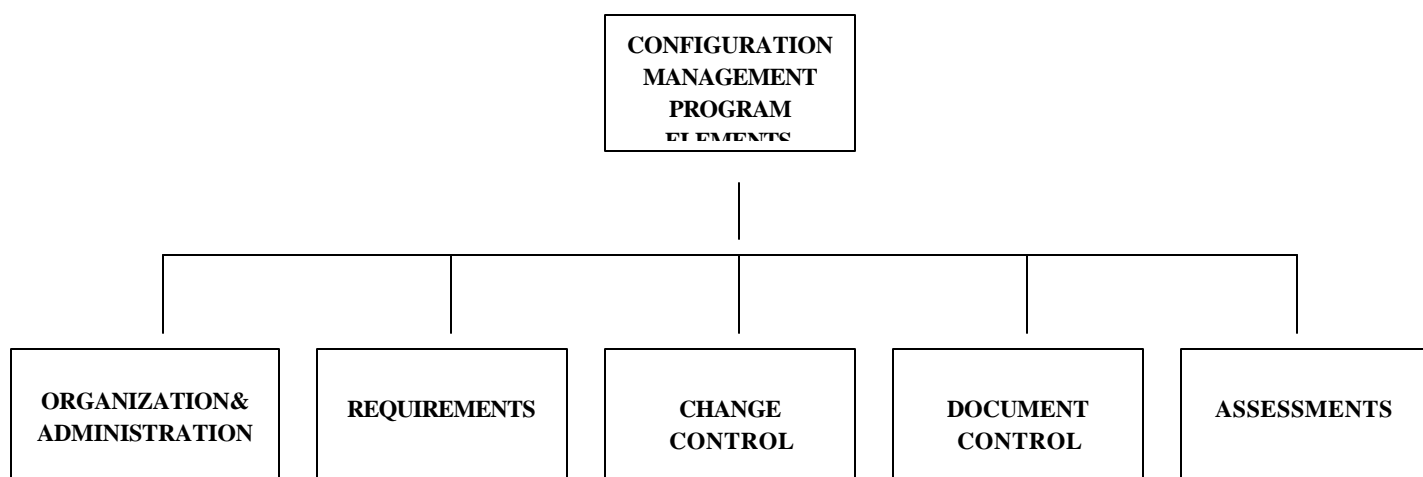


Figure 3—Elements of the Configuration Management Program

Each of the elements of the Configuration Management Program are briefly described below:

A. Organization & Administration

The Configuration Management Program is organized, developed, and administered by Engineering. It ensures that the SSCs included in the program are identified, graded and documented, that organizational interfaces are established and documented, and that the terminology of the Configuration Management Program is clearly defined and documented.

Formal policies and implementing procedures communicate to personnel the responsibilities, authorities, and interfaces for implementing the Configuration Management Program. Training is provided to personnel to improve communication and understanding of important Configuration Management concepts, definitions, and terminology and associated implementing procedures. Adequate staffing and resources are provided; necessary data bases are developed to store and retrieve Configuration Management information, and Configuration Management weaknesses identified during assessments are tracked, and resolved in a timely manner.

Subject: Configuration Management Program

VI. WHAT ARE THE ELEMENTS OF THE CONFIGURATION MANAGEMENT PROGRAM? (cont.)

B. Requirements

The requirements element addresses the functions and constraints that must be satisfied by the SSCs included in the Configuration Management Program. Requirements are contained in the design/operations documents that define the physical, functional, operational, and performance capabilities/limits, and important characteristics of an SSC. The requirements element interfaces with the change control element to provide a basis for deciding whether or not a change is acceptable. Likewise, the requirements element interfaces with the document control element to ensure that the requirements are documented in the design/operations documents, strictly controlled, and available. Requirements can generally be categorized as design, regulatory/safety, or administrative.

1. Design Requirements

Design requirements are found in design (design output) documents such as engineering drawings and specifications, vendor information, and procurement documents. Because design requirements are the output of the design process, they are closely linked to the design basis. The design basis provides the technical and analytical basis for the design requirements. The design requirements specify “what” is required; while the design basis information explains “why” a design requirement was specified. Design basis information is normally found in documents such as the safety analyses, transient calculations, setpoint calculations, sizing calculations, etc.

2. Regulatory/Safety Requirements

Regulatory/safety requirements are constraints established by a local, state or federal agency (e.g., Department of Energy, Department of Transportation, Environmental Protection Agency, Occupational Safety and Health Administration, or State of Tennessee) or an approved safety basis document.

Regulatory/safety requirements are found in regulatory documents or safety documents such as:

- Environmental Permits
- DOE Orders
- Code of Federal Regulations (CFR)

Subject: Configuration Management Program

VI. WHAT ARE THE ELEMENTS OF THE CONFIGURATION MANAGEMENT PROGRAM? (cont.)

- Hazard Evaluation Reports (including associated Change Evaluations)
- Technical Safety Requirements
- Safety Analysis Reports (including associated Unreviewed Safety Question Determinations)
- Other documents where compliance is required to satisfy a Regulator

3. Administrative Requirements

Administrative requirements are imposed by management based on best practices or operating experience. Administrative requirements are no less important than the other requirements. Administrative requirements can generally be found in policies, procedures and management directives. Some documents such as nuclear criticality safety analyses contain administrative requirements that apply to the operation, surveillance, or maintenance of an SSC.

4. Recovery and Reconstitution

For many existing facilities and systems, the design bases/requirements are not available.

The design basis is generally not needed to support daily operations. Therefore, recovery or reconstitution of the design basis will not be undertaken except for special circumstances. Limited recovery may be prudent where the design basis for important SSCs (i.e., safety class or safety significant) already exists but is not readily available. The Design Authority in coordination with the Operations Manager/System Owner will determine if and when design basis recovery or reconstitution is necessary.

However, the requirements may be needed to support: (1) development of Safety Analysis, Technical Safety Requirements, or Operational Safety Requirements, (2) technical review of proposed changes, or (3) safe operation. The Design Authority in coordination with the Operations Manager/System Owner determines when recovery or reconstitution of the requirements is appropriate. The change control process specifically considers the need for reconstitution in support of modifications.

Subject: Configuration Management Program

VI. WHAT ARE THE ELEMENTS OF THE CONFIGURATION MANAGEMENT PROGRAM? (cont.)

Recovery or reconstitution of the requirements may include:

- Document searches of likely sources of requirements such as permits, project records, regulatory correspondence, management instructions, old files, etc.
- Gathering undocumented requirements from experienced engineering and operations personnel. This process should start as soon as possible. The corporate memory is a valuable (and frequently undocumented) source of information that is lost through attrition, transfers, retirement, and death.
- Performing re-analysis of the essential design requirements and design basis. This is the most technically acceptable method for reconstituting missing design requirements but it is typically the most expensive.
- Testing or analyzing an SSC to determine current functionality and accepting these results as design requirements after a technical evaluation by the Design Authority. It is recognized that testing may be the only practical method for showing that a SSCs performance capability remains adequate.

For new facilities or systems or when changes are made to existing facilities or systems, the new design basis/design requirements developed during the design process will be properly documented in the design documentation and controlled. For new facilities or systems, the collective set of design documentation that comprise the technical basis for the design are listed on a Technical Basis Index Summary (TBIS) which is prepared and approved in accordance with Y17-009INS, *Establishing and Maintaining the Technical Basis*. For existing facilities or systems, the Design Authority and the Operations Manager/System Owner will determine whether a TBIS will be prepared.

Subject: Configuration Management Program

VI. WHAT ARE THE ELEMENTS OF THE CONFIGURATION MANAGEMENT PROGRAM? (cont.)

C. Change Control

The change control element ensures that consistency is maintained among the physical/functional configuration, the requirements, and the documentation as changes are made to SSCs. The change control process ensures that changes are properly identified, reviewed, approved, implemented, tested, validated, and documented prior to use. To accomplish this, the change control element is integrated with the requirements element and with the document control element.

The critical components of the change control process are as follows:

1. Identification of Change

Mechanisms and work processes that can lead to a change are identified and controls are established to prevent unauthorized changes. Such mechanisms include physical hardware changes, field changes during implementation, maintenance changes, process changes, operational changes, document only changes, requirement changes, temporary modifications, and process related software changes.

2. Safety and Technical Review

All proposed changes receive safety and technical review(s) to determine if they are consistent with the applicable requirements. The level of detail and rigor is based on the grade of the SSC. The safety and technical reviews include review of safety, environmental and mission impacts; determination of post-implementation testing requirements and acceptance criteria; and identification of the affected design/operations documents. Also, where applicable, proposed changes receive an Unreviewed Safety Question Determination or Change Evaluation.

Proposed changes to safety class, safety significant, or non-nuclear-safety significant SSCs are implemented only after approval by a representative of the Design Authority and applicable Operational Safety Board.

Subject: Configuration Management Program

VI. WHAT ARE THE ELEMENTS OF THE CONFIGURATION MANAGEMENT PROGRAM? (cont.)

3. Management Review

The Operations Manager/System Owner reviews change packages to verify that the safety and technical reviews have been performed adequately, that the package is complete and ready for implementation and that any necessary external reviews and approvals have been obtained prior to their approval for implementation.

4. Implementation

Changes are implemented consistent with approved change packages and the status is tracked. If the change cannot be implemented as approved, then a Field Change Request (FCR) is generated for review and approval. FCRs receive safety and technical reviews commensurate with those of the original change package.

Non-conforming items are identified and documented on Non-Conformance Reports (NCR) and NCRs dispositioned as “Use-as-Is” or “Repair” receive review and approval commensurate with the review and approval of the original change package.

Post-implementation testing is conducted, if required, after implementation to verify the change functions as designed. A walkdown is performed to verify the change was implemented as approved. Based on results of the testing and walkdown of the implemented change, authorization is given for return to operations.

5. Documentation of Changes

Changes are sufficiently documented to serve as a quality record of the change. This documentation includes a description of the change, the safety and technical reviews, management approvals, post-implementation test results, and walkdown results. In addition, any design/operations documents affected by a change are revised (as-built) prior to closeout of the change package.

Change control for existing facilities and systems is implemented with procedure Y15-187, *Integrated Safety and Change Control Process*. Change control for new facilities and systems is implemented with procedure Y15-005, *Technical Change Control for Projects*.

Subject: Configuration Management Program

VI. WHAT ARE THE ELEMENTS OF THE CONFIGURATION MANAGEMENT PROGRAM? (cont.)

D. Document Control

The document control element ensures that the design/operations documents are identified, updated in a timely manner, distributed appropriately, and are readily available to personnel when work is performed or decisions made. Document control ensures that the documentation is maintained consistent with the physical configuration and with the applicable requirements.

The critical components of the document control process are as follows:

1. Identification

The Design Authority in coordination with the Operations Manager/System Owner determines the types of documents (i.e., drawings, calculations, specifications, etc.) included in the Configuration Management Program and identifies document owners for each document type. The document owners are responsible for the technical content of assigned documents. Within the document type, the specific documents associated with the SSCs included in the Configuration Management Program are identified. See VII.C for further discussion on this subject.

2. Control and Tracking

Controls ensure that only the latest approved revision of a document is used. Revisions to documents to incorporate changes are completed in a timely manner. The Operations Manager/System Owner in coordination with the Design Authority establishes the priorities for revision of design/operations documents to reflect changes. The following document information is readily available: revision level, current status, document owner, information regarding pending changes, and other data necessary for control and tracking, such as storage location and outstanding document changes.

Subject: Configuration Management Program

VI. WHAT ARE THE ELEMENTS OF THE CONFIGURATION MANAGEMENT PROGRAM? (cont.)

3. Retrieval

Documents are retrievable upon request. Documents are uniquely identified. When a copy of a controlled document is provided for use, approved but not implemented changes and associated information is also included.

Document control is implemented with procedure Y15-102, *Document Control*.

E. Assessments

The assessments element systematically evaluates the effectiveness of implementation of the other elements of the Configuration Management Program. Periodic assessments are performed to examine the overall work control processes used to maintain the facility/system configuration to determine if the controls are adequate and effective. SSCs are periodically monitored to determine if they continue to be capable of meeting their safety and design requirements.

Physical Configuration Assessments

Physical configuration assessments, or walkdowns, are performed for a representative sample of SSCs to determine the degree of agreement between the physical configuration, the requirements, and the associated documentation. If substantial discrepancies are identified, then corrective actions to improve the control processes or their execution are identified and implemented

Periodic Equipment Performance Monitoring

The critical characteristics of SSCs are periodically monitored to determine if they continue to be capable of meeting their safety and design requirements. This includes surveillances, periodic inspections and tests, and other actions taken to ensure safe and reliable operation. This monitoring considers measurements and trending data (e.g., predictive maintenance program) related to aging and degradation to prevent failure from impacting safety or mission.

For safety-related design features, the Initial Testing and In-Service Surveillance Program formalizes the process of evaluating the critical characteristics and determining appropriate surveillances and/or inspections.

Subject: Configuration Management Program

VII. WHAT RELATED AREAS ARE IMPORTANT TO THE CONFIGURATION MANAGEMENT PROGRAM?

A. Design Authority

The policy directive on Design Authority is found in Y12-020, *Policy on Design Authority*. Engineering is responsible for ensuring the Design Authority function is properly executed. Through the design process, the Design Authority ensures that design inputs are correctly translated into design outputs (i.e., system/process descriptions, drawings, specifications, equipment lists, etc.) which contain the design requirements that accurately reflect the design basis. The Design Authority is responsible for design control and the adequacy of the design process even if it is fully or partially contracted to an outside Architect/Engineer.

The Design Authority establishes and maintains (1) the design documentation and (2) controls the design basis and design requirements as changes occur. The Design Authority establishes the design requirements for the Safety Basis Documents, which describe facility and operational requirements that BWXT Y-12 and National Nuclear Security Administration (NNSA) rely on for safe operations.

The Design Authority reviews and approves proposed changes (permanent or temporary) to SSCs that are not within the previously established and approved design and safety requirements or envelopes. The Design Authority reviews and approves Equivalency Evaluations in accordance with Y15-003, *Equivalency Evaluation Process*.

The Design Authority maintains a hierarchy of procedures for the design component of the Configuration Management Program which, through proper execution, ensures consistency is established and maintained among the physical configuration, the requirements, and the associated design/operations documentation.

The Design Authority function is executed through a combination of the Discipline Design Managers and the Design Authority Representatives (DARs). Further details on this arrangement are provided in Y17-002PD, *Conduct of Engineering Program*.

Subject: Configuration Management Program

VIII. WHAT RELATED AREAS ARE IMPORTANT TO THE CONFIGURATION MANAGEMENT PROGRAM? (cont.)

DARs are appointed for each Y-12 operating facility and plant-wide system, as defined in the CONOPS Manual. Primary DAR functions include:

- Establishing and maintaining the design basis and design requirements
- Integrating design discipline requirements, resolving conflicts as necessary
- Evaluating and approving changes, while ensuring consistency with and preserving the integrity of the design basis

B. System Engineer Program

System Engineers have a key role in the Configuration Management Program. They have the lead responsibility for coordination of configuration management activities for their assigned systems. System Engineers ensure that the physical configuration is maintained consistent with the design requirements, and that change requests, equivalency evaluations, temporary modifications, and non-conformances are properly and formally processed. System Engineers work closely with their respective DARs on configuration management activities, including obtaining DAR review and approval for proposed changes.

System Engineers are assigned to all Y-12 vital safety systems and most other systems included in the Configuration Management Program. They are assigned by the organization that owns the operating facility/plant-wide system. For any systems that do not have a system engineer assigned, then someone from the organization that owns the operating facility/plant-wide system assumes the role of the system engineer for configuration management activities.

System Engineers provide a technical focal point for each operating system. They develop resident technical expertise and centralize resolution of SSC performance issues. They provide an important interface between the operations, maintenance, and engineering organizations. System Engineer functions include:

- Maintaining physical and functional configuration
- Monitoring system status and performance
- Providing technical support to operations and maintenance

Subject: Configuration Management Program

VII. WHAT RELATED AREAS ARE IMPORTANT TO THE CONFIGURATION MANAGEMENT PROGRAM? (cont.)

C. Design/Operations Documentation

The design/operations documentation consists of a set of documents, important to the Configuration Management Program, that evolve during design and after transition to operations. The Design Authority and the Operations Manager/System Owner are responsible for establishing and maintaining their respective portion of the design/operations documentation. Changes to approved design/operations documents are strictly controlled.

Design Basis Documents are those documents which contain the design inputs, the design constraints, and the design analysis and calculations. It includes topical areas such as seismic qualification, fire protection, and safe shutdown. The design basis encompasses consideration of such factors as facility availability, facility efficiency, costs, and maintainability, and that subset that relates to safety and the approved safety basis. The design basis explains why a design requirement has been specified in a particular manner or as a particular value.

Design Requirements Documents are documents that contain engineering requirements (such as drawings and specifications) that are the design output from the design process. These documents define the functions, capabilities, capacities, physical sizes and dimensions, limits and setpoints, etc. specified by design engineering for a structure, system or component. The design requirements provide the results of the design process.

Design Documents are those documents that, collectively, define both the design requirements and the design bases of a facility or system. Design documents include design specifications, design change packages, design drawings, design analysis, setpoint calculations, summary design documents, correspondence with DOE that provides design commitments, and other documents that define a facility or system design.

Operations Documents are those documents that support facility or system maintenance and operability. These documents include as-built configuration information (such as drawings, valve lists, etc.), facility/system procedures for activities (such as operations, maintenance and testing), and facility/system operational records (such as completed tests, work requests, and radiation survey maps).

Subject: Configuration Management Program

VII. WHAT RELATED AREAS ARE IMPORTANT TO THE CONFIGURATION MANAGEMENT PROGRAM? (cont.)

Operations support and change control can be effectively managed at a system level writing one-line type drawings indicating the functional arrangement of systems and components. As a result, it is expected that the majority of the drawings used for change control (i.e., configuration control drawings) will be of the one-line type (e.g., P&ID, one-line electrical diagram). Other drawings indicating greater detail may be appropriate for control systems, safety-related features, etc.

D. Integrated Safety Management

The Configuration Management processes are key implementing tools for the Integrated Safety Management Program described in Y15-635PD, *BWXT Y-12 Integrated Safety Management System*. Effective implementation of the Configuration Management Program will lead to increased facility safety and reliability, and improved environmental protection by providing complete and accurate technical information to support safe, sound, and timely decision-making related to design and operations.

The integrated safety management system (ISMS) is organized around the following five core functions:

- Define scope of work,
- Analyze hazards,
- Develop and implement controls,
- Perform work, and
- Feedback and improvement.

ISMS is executed through the following elements of Configuration Management:

- Organization & Administration
- Requirements
- Change Control
- Document Control
- Assessments

The following briefly summarizes how the ISM functions correlate with the Configuration Management elements:

Subject: Configuration Management Program

VII. WHAT RELATED AREAS ARE IMPORTANT TO THE CONFIGURATION MANAGEMENT PROGRAM? (cont.)

Define the Scope

The scope of the Configuration Management Program for a facility or system is outlined in the Configuration Management Plan.

The functional and performance requirements scope is outlined in an approved System Requirements Document (SRD). The SRD is prepared at the beginning of a project and is updated as needed during the project evolution to provide configuration control of the requirements for a project.

Analyze the Hazards

The technical and safety reviews performed as part of the Change Control process evaluate changes for compliance with existing safety and hazard analyses. These analyses are revised to address any new hazards associated with changes to an operating facility or system. The safety analysis and hazard evaluations performed for facilities or systems also identify and analyze hazards and establish necessary controls and mitigative processes.

Develop and Implement the Controls

The control processes of the Configuration Management Program are Change Control and Document Control. These processes ensure that changes to the configuration of an existing facility or system are properly reviewed, controlled, and accurately reflected in the design/operations documents effected by the change.

Configuration Management Requirements are documented for a project to ensure:

- Configuration control is maintained throughout design and construction;
- Acceptance and test criteria are developed and implemented;
- Turnover and transition requirements are developed and implemented;
- Environmental Impacts are understood and mitigated; and
- Appropriate Safety Analysis is performed and mitigation controls are developed.

Subject: Configuration Management Program

VII. WHAT RELATED AREAS ARE IMPORTANT TO THE CONFIGURATION MANAGEMENT PROGRAM? (cont.)

Perform Work

Implementation of changes to an existing facility or system is initiated, controlled, and the status of implementation is tracked through the Change Control process. This process also establishes controls for field changes and non-conforming items dispositioned “Use as Is” or “Repair.”

Construction is performed in accordance with the Certified for Construction design package. Controls are also established for field changes and non-conforming items.

Feedback and Improvement

Periodic independent and management self-assessments are conducted to examine the operations and maintenance work control processes used to maintain the facility or system configuration to determine if the controls are adequate and effective. If discrepancies are identified, then corrective actions to improve the control processes (or their execution) are identified and implemented.

Project team meetings are conducted to elicit feedback and appropriate information for entry into the Lessons Learned System. Project documentation is updated in a controlled fashion as new information is identified. Periodic design reviews are conducted to verify design accuracy. The project Quality Assurance Plan outlines the process for verifying that the execution of the project actually conforms to the design requirements and where it does not to take appropriate action to resolve.

E. Procurement Control

The procurement controls that are needed to support an effective Configuration Management Program are:

- Procured items and services are required to meet established requirements and perform as specified. Prospective suppliers are evaluated and selected on the basis of specified criteria. Processes to ensure that approved suppliers continue to provide acceptable items or services are established and implemented.

Subject: Configuration Management Program

VII. WHAT RELATED AREAS ARE IMPORTANT TO THE CONFIGURATION MANAGEMENT PROGRAM? (cont.)

- The test/inspection requirements and acceptance criteria for specified items and services are clearly stated in controlled procurement documents. Results of inspection and test activities are documented and retained as quality records.
- Supplier documents are received and transmitted to the appropriate Document Management Center. These documents may include certificates of conformance, drawings, analyses, test reports, maintenance data, non-conformances, corrective actions, approved changes, waivers, and deviations.
- Receipt inspections are conducted to ensure conformance with design requirements, including verifying that the supplier has provided specified documentation.
- Nonconforming conditions identified during the inspection or examination of completed items or work are documented on Nonconformance Reports and dispositioned.

Procurement controls are established and implemented by procedures. For Grade 1 or Grade2 SSCs, procurement controls are in accordance with Y60-705, *Acquisition, Control and Traceability of Safety SSCs*. For all other SSCs, procurement controls are in accordance with Y60-701, *Procurement Quality*.

If procurement activities are subcontracted, then the subcontractor is responsible for implementing a documented procurement control process that complies, as a minimum, with this Section. Adequacy of the subcontractors procurement control process is determined during the bid evaluation process and periodically reevaluated during the design and construction phase.

F. Material and Equipment Control

The material and equipment control and traceability processes needed to support an effective Configuration Management Program are:

- Spare parts, material, and equipment are identified and controlled to ensure they are used in the proper application. Items are controlled after issue to ensure use in the correct application and to maintain the necessary traceability.

Subject: Configuration Management Program

VII. WHAT RELATED AREAS ARE IMPORTANT TO THE CONFIGURATION MANAGEMENT PROGRAM? (cont.)

- Items are stored to provide adequate protection to prevent their damage, loss, or deterioration. Items are stored with due consideration for the environmental conditions specified in the design requirements. Receiving inspection and material and equipment holding areas are provided to control access to material and equipment as required.
- A shelf life control program is provided for stored items, with finite lifetimes, important to safe and reliable facility or system operation.
- Controls are established for consumables to ensure they are properly stored, identified, and used.
- A listing of spare parts, material, and equipment available for issue is developed. This list provides a cross-reference to such information as manufacturer part number, facility part number, noun name, and component or system for which a part is used.
- A method is established to identify spare parts, material, and equipment that are designated for projects, maintenance activities or modifications. Methods such as staging, tagging, or other designation are used.

Material and equipment control and traceability is established and implemented by procedures. For Grade 1 and Grade 2 SSCs, material control and tracability follow Y60-705, *Acquisition, Control, and Traceability of Safety SSCs*.

If design and construction is subcontracted, then the subcontractor is responsible for implementing a documented material and equipment control and traceability process that complies, as a minimum, with this Section. Adequacy of the subcontractor's material and equipment control and traceability process is determined during the bid evaluation process and periodically reevaluated during the design and construction phases.

Subject: Configuration Management Program

VIII. HOW IS CONFIGURATION MANAGEMENT APPLIED DURING DESIGN AND CONSTRUCTION?

A. Identification of Design Inputs

The Project Team identifies, documents, and approves the functional and performance requirements that are the initial design inputs. The design inputs are documented in a System Requirements Document (SRD). The nature and complexity of the project will determine the format, scope, and depth of the SRD. The SRD documents the fundamental scope of the project and identifies the functional/performance requirements, the boundaries and interfaces, and any uncertainties.

B. Configuration Management Requirements

The Project Team establishes and documents the Configuration Management requirements for the project. The requirements address the overall scope and coordination of Configuration Management activities. They define the project boundaries, the roles and responsibilities (including Y-12 plant personnel and subcontractor personnel) and the required interfaces. The Configuration Management requirements would identify and describe the processes that will be used to control changes to design inputs, design outputs, and the physical configuration during the design and construction phases.

The Configuration Management requirements would be in effect throughout the design and construction phase up to turnover/transition to operations control. After turnover/transition, the Configuration Management requirements for the operational facility or system would be in effect.

C. Quality Assurance Requirements

The Project Team establishes and documents the Quality Assurance (QA) requirements for the project. The QA requirements describe the processes utilized to manage, design, execute/construct, and confirm the acceptability of the project and its components. The QA requirements will be based upon the 10 criteria and associated requirements established in Y60-101PD, *Quality Program Description*, and 10 CFR 830.120, *Quality Assurance Requirements*. The QA requirements may include specific instructions on how to perform activities including acceptance criteria and/or may reference other implementing plans, specifications, procedures and programs.

Subject: Configuration Management Program

VIII. HOW IS CONFIGURATION MANAGEMENT APPLIED DURING DESIGN AND CONSTRUCTION? (cont.)

D. Transition Requirements

The Project Team establishes and documents the Transition requirements for the project. The Transition requirements include a list of the design/operations drawings and other documents that are needed to support operation and maintenance and support the safety and technical review of changes to SSCs. The Design Authority and/or the Operations Manager/System Owner may add additional drawings and documents during the design and construction phase. The design/operations documents would be developed during design and red lined to reflect the as-built configuration during construction. At the completion of construction and prior to transition to operations, the design/operations documents are revised to reflect the as-built configuration. In this way, the as-built configuration and the design basis/requirements are adequately documented to support ongoing Configuration Management for the operating facility or system. Specifically, the single line type, functional diagrams should be especially considered for field verification and turnover for operations.

The decision on what design/operations documents are required should be based upon the safety classification and the importance to mission or to protecting the environment. The documents needed to support operation and maintenance include but are not limited to: drawings, calculations, equipment specifications, applicable codes and standards, operating and maintenance requirements, vendor component instructions, spare parts lists, etc.

E. SSC Identification and Grading

As early as possible in design but after the preliminary hazard evaluation and safety analysis has been completed, a preliminary list of SSCs included in the Configuration Management Program should be identified and documented by the Design Authority using Y15-009INS, *Criteria for Application of Configuration Management*. By applying the grading criteria of Y15-001INS, *Grading Criteria for Y-12 Facilities and Systems* the preliminary list of SSCs are graded. The SSC grade is used in managing the design and construction phase.

The grading process is taken to the component level necessary to ensure that the necessary Quality Assurance requirements and controls (e.g., procurement controls, material controls to maintain pedigree, etc.) are applied commensurate to the hazard or impact on the environment or to mission should the configuration of the SSC be

Subject: Configuration Management Program

VIII. HOW IS CONFIGURATION MANAGEMENT APPLIED DURING DESIGN AND CONSTRUCTION? (cont.)

compromised. As the design and safety analysis are finalized so are the SSC list and SSC grades.

F. Design Change Control

Proposed design changes to approved design documentation during design and construction are controlled. Design changes include those changes that are initiated by the Design Authority and those that are the result of requests from other organizational units including Operations or Maintenance. Design changes are controlled by measures commensurate with those applied to the original design.

Proposed design changes are formally requested and documented. A Project Change Request (PCR) per Y15-005, *Technical Change Control for Projects* can be used to provide a complete description of the proposed design change and its resulting impacts on the design documentation. The proposed design change is reviewed for technical feasibility, conformance to mission requirements, and impact on other technical requirements. If the design change is deemed necessary and acceptable, then the PCR is approved. The PCR (approved or disapproved) is retained as a record.

Changes to an approved design documents Can be formally authorized and documented using a document change notice (DCN) when the document will not be revised immediately. A change which affects more than one design document requires a separate DCN for each document affected.

G. SRD Revisions

As the design progresses, new requirements or design inputs may be identified that need to be reflected in the SRD. The SRD is maintained current throughout the design and construction phase. The approval authority for the updated SRD is identified in the configuration change control process contained in the project's Project Execution Plan. or, if no Plan exists, is the same as the initial issue of the SRD. Generally, the SRD is updated only when the requirements change or need modification as a project evolves.

Subject: Configuration Management Program

VIII. HOW IS CONFIGURATION MANAGEMENT APPLIED DURING DESIGN AND CONSTRUCTION? (cont.)

H. Facility/System Design Description

The Project Team determines the need to develop a Facility/System Design Description (F/SDD). The F/SDD can serve as the vehicle for collecting and conveying the requirements associated with SSCs, explains why those requirements exist (that is, provides the basis for the requirements), and describes the features of the facility/system design provided to meet those requirements.

The F/SDD contains requirements that are derived from programmatic, performance, or functional needs as well as from the associated safety analyses. The F/SDD is updated to include more detail as the design and safety analysis processes evolve from concept through preliminary design to final design. The F/SDD is a valuable source document for performing the technical and safety reviews for a change to a facility or system.

I. Design Basis/Design Requirements

As new design basis/design requirements are developed during the design phase, they are included in the design documentation and controlled consistent with the needs of the Configuration Management Program.

J. Field Changes and Non-Conformances

During construction any deviations from the approved drawings and documents are identified and documented on Field Change Notices (FCN). If the FCN involves a technical change, then a Project Change Request (PCR) is initiated to disposition the FCN. The PCRs are reviewed consistent with the original design review and approval to verify they are in compliance with the original design assumptions, facility safety criteria, calculations, technical reviews, and other design considerations. The review and approval of the PCRs and their associated FCNs is documented. At completion of construction and transition to operations, the PCRs and associated FCNs are retained as a record.

Nonconforming items are identified and documented on Non-Conformance Reports (NCR) in accordance with Y60-301, *Control of Non-Conforming Items (or Services)*. These NCRs are reviewed consistent with the original design review and approval to verify they are in compliance with the original design assumptions, facility safety criteria, calculations, technical reviews, and other design considerations. NCRs dispositioned as “Use as Is” or “Repair” must be approved by the Design Authority. The review and

Subject: Configuration Management Program

VIII. HOW IS CONFIGURATION MANAGEMENT APPLIED DURING DESIGN AND CONSTRUCTION? (cont.)

disposition of NCRs are documented and retained as a record at completion of construction and transition to operations.

K. Transition to Operations

A documentation package is developed to transition the facility or system to operations at completion of construction to support the operational Configuration Management Program. The documentation package may include:

- Final F/SDD and As-built design/operations documentation.
- Appropriate lists and indexes (e.g., instrument index, valve list, master equipment list).
- Quality records (inspection and test reports, procurement documents, vendor manuals, manufacturer data, etc.).

IX. RECORDS

Records generated as the result of this procedure are maintained in accordance with BWXT Y-12 records management practices and established retention and disposition schedules.

X. OTHER DOCUMENTS NEEDED

- Y12-020, *Policy on Design Authority*
- Y15-001INS, *Grading Criteria for Y-12 Facilities and Systems*
- Y15-003, *Equivalency Evaluation Process*
- Y15-005, *Technical Change Control Process for Projects*
- Y15-009INS, *Criteria for Application of the Y-12 Configuration Management Program*
- Y15-102, *Document Control*
- Y15-187, *Integrated Safety and Change Control Process*
- Y15-635PD, *BWXT Y-12 Integrated Safety Management System*
- Y17-009INS, *Establishing and Maintaining the Technical Basis*
- Y60-101PD, *Quality Program Description*
- Y60-301, *Control of Non-Conforming Items (or Services)*
- Y60-701, *Procurement Quality*
- Y60-705, *Acquisition, Control and Traceability of Safety SSCs*